



# 70 ways

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Sandia has  
changed  
the nation



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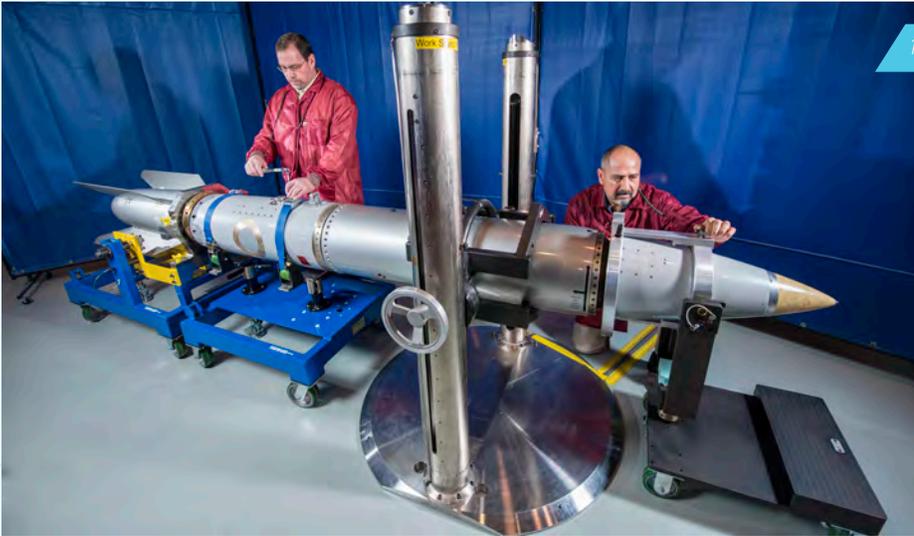
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# 70 ways

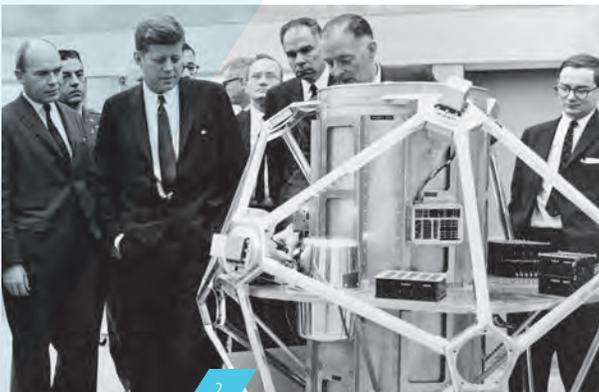
Sandia has changed the nation

Since 1949, Sandia National Laboratories has developed science-based technologies that support national security. Americans depend on Sandia technology to solve national and global threats to peace and freedom. Here, portrayed in no particular order, are 70 of those solutions ...



## Nuclear deterrence

The nation initially assigned Sandia responsibility for stockpile surveillance in 1949, and it still plays a key role in ensuring the safety and reliability of the nuclear arsenal in support of nuclear deterrence. Sandia continually evaluates components, subsystems, and system performance and today is extending the life of nuclear weapons in the nation's stockpile, most of which were initially produced 40 years ago.



## Satellites

Beginning with the VELA satellite program for detecting nuclear bursts in the 1960s, Sandia has designed sensors and accompanying ground processing systems to support verification of international arms control agreements. Sandia has fielded payloads and ground processing systems for 23 Defense Support Program satellites and 51 Global Positioning System satellites. In 2000, Sandia designed and built the Multispectral Thermal Imager (MTI) satellite, which is still used to monitor treaty provisions, map chemical spills, detect pollution, and detect volcanic activity.



## Nuclear weapons security

In 1960, Sandia developed the permissive action link, a coded electromechanical security lock that prevents unauthorized use of a U.S. nuclear weapon. The technology helped reassure the public that a scenario involving a stolen nuclear weapon was impossible.



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## Nonproliferation

Sandia conducts major efforts aimed at preventing the global spread of nuclear weapons and other weapons of mass destruction. Technologies range from microscopic sensors to large intelligence-gathering systems that help monitor international treaty compliance, theft or diversion of nuclear materials, and biological and chemical weapons programs.

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## Antiterrorism

For the past several years, a Sandia chemical monitoring system called SNIFFER has been keeping watch over large, national-scale indoor and outdoor events, such as the Super Bowl, the Rose Bowl, Major League Baseball games, and a Democratic National Convention. SNIFFER is able to detect and provide early warning of airborne chemical agents that might be used in a terrorist attack.



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## National security

If a nuclear detonation occurs in space or the Earth's atmosphere, the U.S. Air Force is responsible for determining the event's significance using data from the U.S. Nuclear Detonation Detection System (USNDS) — a network of satellites, detectors, and ground stations. The Integrated Correlation and Display System developed at Sandia helps simplify the work of Air Force personnel by gathering, correlating, and making sense of USNDS satellite data before an operator ever sees it.



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## Shooter ID

By using a chemical test developed by Sandia and Law Enforcement Technologies, Inc., police officers are now able to instantly determine whether a suspect has recently fired a gun. The "instant shooter ID kit" detects gunshot residue in a matter of minutes, eliminating the need to wait for lab tests that can take weeks.



## Supercomputing

Sandia has led U.S. supercomputing innovations for decades, beginning with ASCI Red, the first computer capable of more than a trillion operations a second. Its successor, Red Storm, proved a popular tool for U.S. government agencies, universities, and customers worldwide. Designed to run nuclear stockpile calculations, Red Storm also modeled the amount of explosive powder needed to destroy an asteroid and how changes in the composition of Earth's atmosphere affect climate. In 2018, Sandia's Astra became the world's fastest supercomputer based on Arm technology, previously used only for cell phones and other low-power devices. Astra also is the first advanced prototype platform to evaluate emerging high-performance computing technologies for stockpile stewardship.

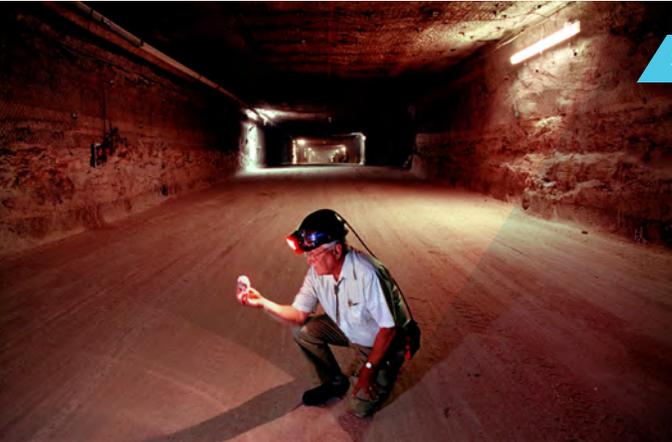
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## Nuclear waste management

As scientific advisors, Sandia helped select the site for the Waste Isolation Pilot Plant (WIPP) and provided the facility's conceptual design, as well as the scientific understanding that formed the basis for the Environmental Protection Agency's certification of WIPP in 1999. WIPP, the nation's first underground nuclear waste repository, was constructed in salt beds more than 2,000 feet below ground near Carlsbad, NM, and began receiving waste from nuclear weapons complex activities in 1999. Sandia began investigations into Yucca Mountain as a possible repository for high-level waste from nuclear reactors in the 1970s and in 2006 was named the lead scientific laboratory for the project.

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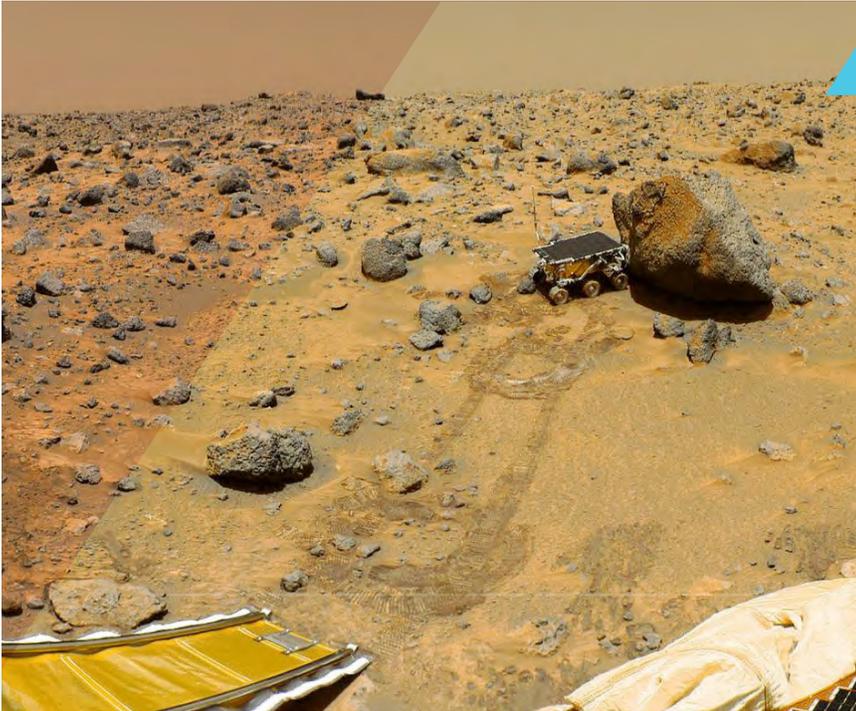


## Radiation hardening

The ability of the Galileo spacecraft to survive Jupiter's radiation belts was made possible by radiation-hardened components designed and built by Sandia. Launched in 1989, Galileo traveled 2.8 billion miles and endured more than four times the dose of Jovian radiation it was designed to withstand before disintegrating in the planet's atmosphere in 2003.

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## Planetary exploration

When the Pathfinder spacecraft hit the surface of Mars on July 4, 1997, it bounced and rolled rather than crash landed, largely as a result of airbags designed by Sandia and NASA's Jet Propulsion Laboratory. The airbags were based on parachute technology developed for nuclear weapons.

## Nuclear power safety

In 1989, Sandia first released MELCOR, a computer software for analyzing severe accidents in nuclear power plants. The software — updated numerous times since — incorporates the results of nuclear power plant safety research since the 1979 Three Mile Island accident and is the *de facto* standard for evaluating plant safety among utilities and nuclear regulators in the U.S. and abroad.

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## Hydrogen monitoring

The ability to detect and monitor hydrogen — a colorless, odorless, and flammable gas — is critical wherever it is produced, used, stored, or transported. A Sandia-developed sensor that can detect hydrogen has been commercialized by H2scan of Valencia, CA, and is now used in such areas as petroleum refining, hydrogen production, and nuclear facilities.



## Cyber security

Sandia's Center for Cyber Defenders program trains college students to protect and defend computer systems and networks from attack. Through their projects, the students actively help secure computers nationwide.



## Satellite interception

In February 2008, Sandia's Red Storm high-performance computer was used to help the U.S. military plan and carry out the successful interception of a defective spy satellite that threatened to fall to Earth. A Sandia team ran hundreds of impact calculations using advanced modeling and simulation tools to determine the best way to ensure the car-sized satellite — traveling 153 miles above the Earth at 17,000 miles an hour — was destroyed with a single missile shot.



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### Law enforcement

Diversionary devices, such as flash-bangs or stun grenades that law enforcement and the military use to temporarily distract or disorient an adversary, can result in serious injuries because they function by creating a small explosion. Sandia developed a safer, non-explosive flash-bang technology and in 2008 licensed it to industry.

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## Treaty verification

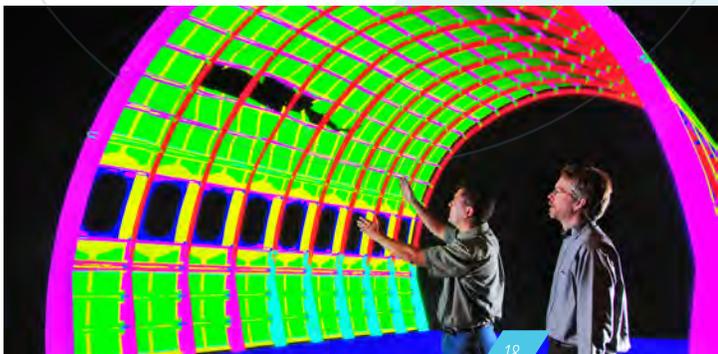
From the start of nuclear testing and arms control negotiations, Sandia has provided input on the technological options for monitoring international treaty compliance. Since the 1960s, it has helped create technological solutions for monitoring via satellite and seismic systems. Sandia also created the Technical On-Site Inspection system in support of the 1987 Intermediate-range Nuclear Forces treaty. Sandia designed, tested, and delivered non-intrusive detection equipment that measures neutron levels to verify treaty compliance. The latest generation of these devices — supporting monitoring of the New START treaty with Russia and other international agreements — is lighter, more rugged, and designed to be more sustainable.



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## Airport screening

The familiar walkthrough portals at many airport security checkpoints use Sandia-patented technology to screen airline passengers for explosives. Even trace amounts of explosives on an individual's skin or clothing can be collected and identified using this technology.



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## Aviation security

To assess the threat of onboard explosions from terrorist bombs, Sandia developed computer models that predict the damage caused by different types of explosives in various locations of passenger aircraft. This work, done in conjunction with testing homemade explosives, is being used by the Transportation Security Administration to develop new requirements for explosives detection technology used for security checkpoints, checked baggage, and air cargo.



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## Aircraft safety

Airline technicians can now spot dangerous short-circuits before, instead of after, they happen. A Sandia technique called Pulse Arrested Spark Discharge (PASD) reveals weak spots in wiring insulation while the plane is still on the ground.

## Anthrax investigation

Sandia researchers assisted the FBI in its investigation of anthrax-containing letters mailed in 2001 to several news media offices and two U.S. senators. Using advanced microanalysis tools developed for nuclear weapons work, they analyzed hundreds of samples and determined the anthrax in the letters was not prepared to disperse more readily through the use of additives — a crucial finding that helped guide the FBI's successful investigation.

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## Anthrax decontamination

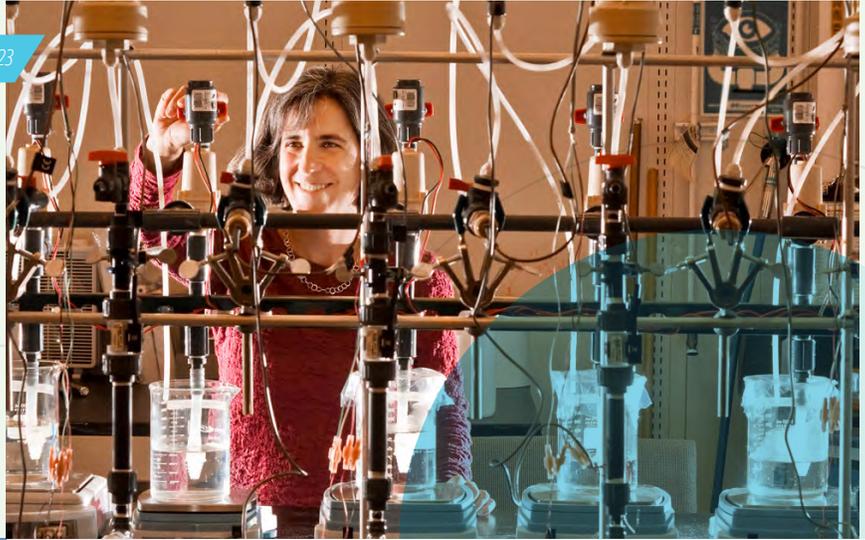
In 2001, federal authorities used a decontamination foam developed at Sandia to help rid Capitol Hill buildings of anthrax. The foam — a cocktail that includes ordinary household substances such as those found in hair conditioner and toothpaste — neutralizes chemical and biological agents in minutes and is non-toxic and environmentally friendly.



## Arsenic removal

Helping communities find cost-effective methods for removing arsenic from drinking water and meeting new federal arsenic standards was the goal of Sandia-led partnerships. Five water treatment site demonstrations were conducted in New Mexico, including two on tribal lands. Test results from the demonstration projects have been compiled on a website, examining the effectiveness of alternative technologies under a variety of site conditions, along with costs associated with each.

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## Bomb disablement

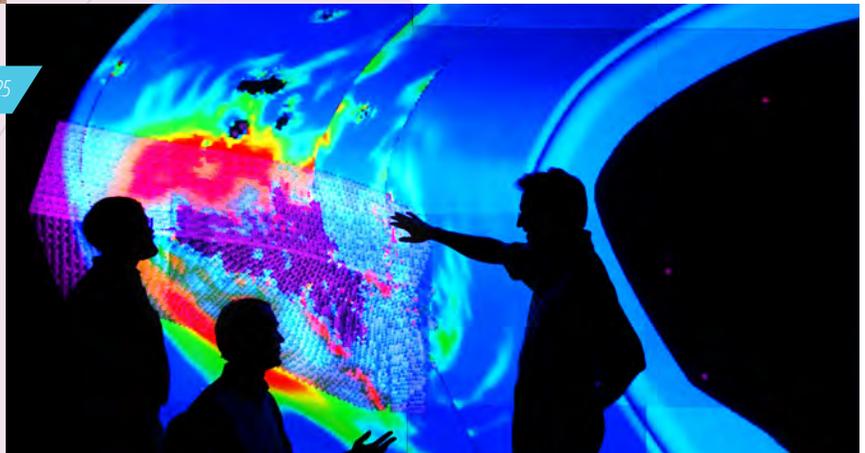
The shoe bomb that Richard Reid tried to detonate on a trans-Atlantic flight and a device found in the cabin of convicted Unabomber Theodore Kaczynski were disabled using an advanced bomb squad tool originally developed at Sandia. The device, called the Percussion-Actuated Nonelectric (PAN) Disrupter, is manufactured by Ideal Products of Lexington, KY, and is used by bomb squads nationwide.



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## Columbia accident investigation

Sandia's expertise in materials and engineering science played a key role in helping NASA determine the cause of the 2003 space shuttle Columbia disaster. Using supercomputer simulations and experimental materials characterization data, Sandia showed that the most probable cause of the accident was damage to the shuttle's wing from foam debris.

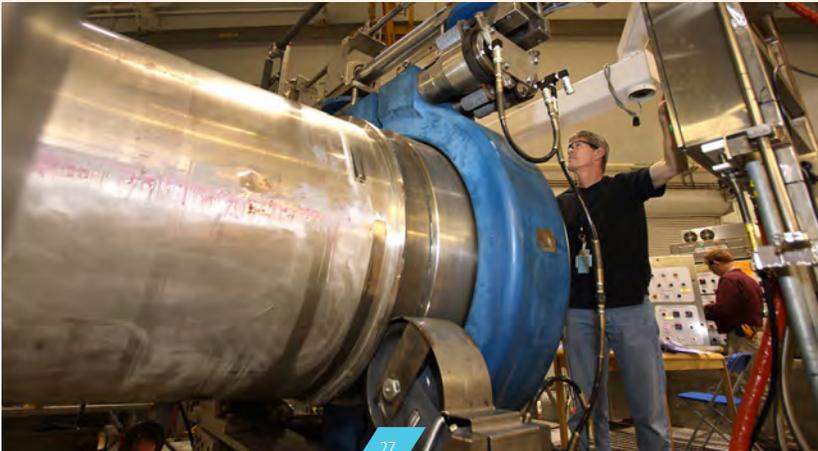




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## TWA Flight 800 investigation

Sandia computer modeling efforts helped guide the National Transportation Safety Board investigation of the July 1997 TWA Flight 800 accident, which killed all 230 people on board. The international investigative team concluded that the accident was most likely caused by the unintended ignition of fuel-air vapors in the jetliner's central fuel tank, resulting in a mid-air explosion.



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## Explosive destruction

The Explosive Destruction System (EDS), developed by Sandia for the Army, safely neutralizes and discards recovered chemical warfare material in an environmentally sound manner. The Army uses EDS to destroy World War I and World War II vintage chemical warfare materials, but it can also treat biological agents, biocontaminated containers, and improvised biological devices.



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## Wind energy efficiency

An innovative, 27.5-meter wind turbine blade developed by Sandia and industry produces up to 10 percent more energy than traditional linear blade designs without increasing wear and tear on the machine. Researchers at Sandia's Scaled Wind Farm Technology (SWiFT) facility in Lubbock, Texas, also have used data from a custom scanning lidar to model downwind turbine wakes, then developed a controller that steered the wake away from the downstream turbine to increase energy production.

## Strategic Petroleum Reserve

America's emergency reserve of crude oil is stored in natural salt caverns along the Gulf Coast at depths up to 5,000 feet. Since 1977, Sandia has provided DOE with scientific and engineering assistance on the Strategic Petroleum Reserve (SPR), including helping DOE evaluate and choose additional storage sites when SPR was increased to a one-billion-barrel capacity.



## Climate change

Sandia scientists are members of an international research team whose work at the Atmospheric Radiation Measurement Climate Research Facility in northern Alaska is providing data for global climate models and helping transform scientific understanding of the Earth's future climate. Their work at this DOE facility focuses on making long-term measurements of cloud formation and its influence on atmospheric heating.



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## Molten salt technology

Molten salt technology for capturing and storing the sun's heat was developed and advanced at Sandia and was an integral part of the Solar Two power plant near Barstow, CA. Solar Two produced enough power to supply 10,000 homes during its operation from 1996 to 1999.



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## Combustion science

Since 1981, researchers at Sandia's Combustion Research Facility have developed ways to detect and measure chemical species in flames, reduce air pollution from engines and coal-powered utility plants, and characterize combustion taking place inside automobile and truck engines. They have revolutionized current understanding of combustion and continue to work with industry to develop more efficient, cleaner-burning combustion processes and devices.



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## Drilling technology

In the 1970s, a promising new rock drilling technology — the polycrystalline diamond compact (PDC) drill bit — was introduced but results in the field were disappointing as cutters broke, separated from bits, or wore too quickly. As a result of Sandia research, industry collaboration, and field testing, design deficiencies were identified and corrected, and now PDC bits account for about two-thirds of all oil and gas drilling because of their efficiency and resistance to wear.

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## Solar power

Since 1996, Sandia has helped bring power to more than 400 homes on the Navajo reservation, using solar technologies such as photovoltaics. Through the DOE Tribal Energy Program, Sandia personnel provide technical assistance in procuring the equipment and teach residents how to manage and maintain it.



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## Military sensing

During the Vietnam War, Sandia developed a family of earth-penetrating, air-dropped sensors for use in detecting enemy forces, particularly troops moving into South Vietnam along the Ho Chi Minh Trail. Capable of detecting even human footsteps, the highly sensitive seismic intrusion detectors were credited with helping break the siege of Khe Sanh in 1968.



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## Advanced radar

Sandia is a world leader in advancing synthetic aperture radar (SAR), which can produce high-resolution, almost photo-like images of terrain and structures through inclement weather and at night. Sandia-developed SAR systems have been used by the military in such high-profile conflicts as Desert Storm and the Kosovo conflict. In 2014, Sandia transferred Copperhead — a modified MiniSAR system mounted on unmanned aerial vehicles and used to uncover IEDs — to the U.S. Army.



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## Computation-based product design

Goodyear's Assurance TripleTred tire, which at the time was the most recommended all-season tire for passenger cars, was the result of a partnership with Sandia. Sandia's powerful computer codes allowed Goodyear to produce innovative tires in record times by eliminating the need for repeated prototype development, testing, and redesign.



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## International cooperation

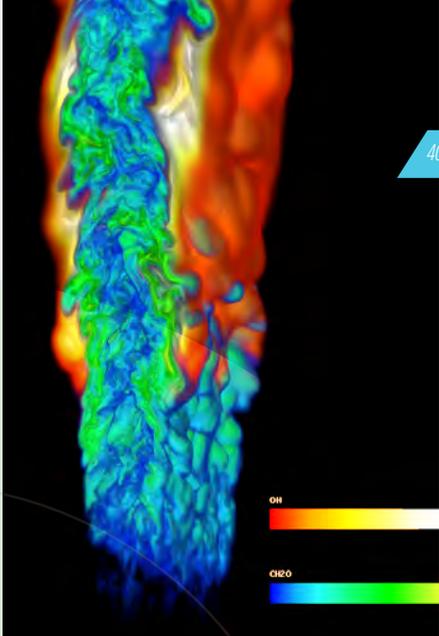
Since 1994, Sandia's Cooperative Monitoring Center has brought individuals from more than 120 countries to neutral ground to develop technical solutions to mutual security problems. Unique in the world, the center develops and offers training in an array of technologies for improving regional security, building trust among nations, and preventing the proliferation of weapons of mass destruction.



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## USS Iowa investigation

A Sandia investigation for the U.S. Senate Armed Services Committee of the 1989 explosion aboard the USS Iowa found that an overram of the powder bags as the gun was being loaded was the likely cause of the explosion; the Navy disagreed, concluding the cause could not be determined. The Sandia team also found no evidence to support the theory that a crew member used a detonator to set off the explosion that killed him and 46 other crew members.



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## Chemistry

In the late 1970s, scientists at Sandia's Combustion Research Facility needed a more efficient way of solving combustion problems involving complex chemical kinetics phenomena. Their homegrown code became CHEMKIN, a software suite licensed by industry and used worldwide in the microelectronics, combustion, and chemical processing industries.



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## Mine safety

The January 2006 explosion that killed 12 miners in West Virginia's Sago Mine likely was triggered by the effects of a lightning strike traveling deep into the mine, a Sandia investigation concluded. The findings were included in the U.S. Mine Safety and Health Administration report, which has led to proposed new safety measures for mines.

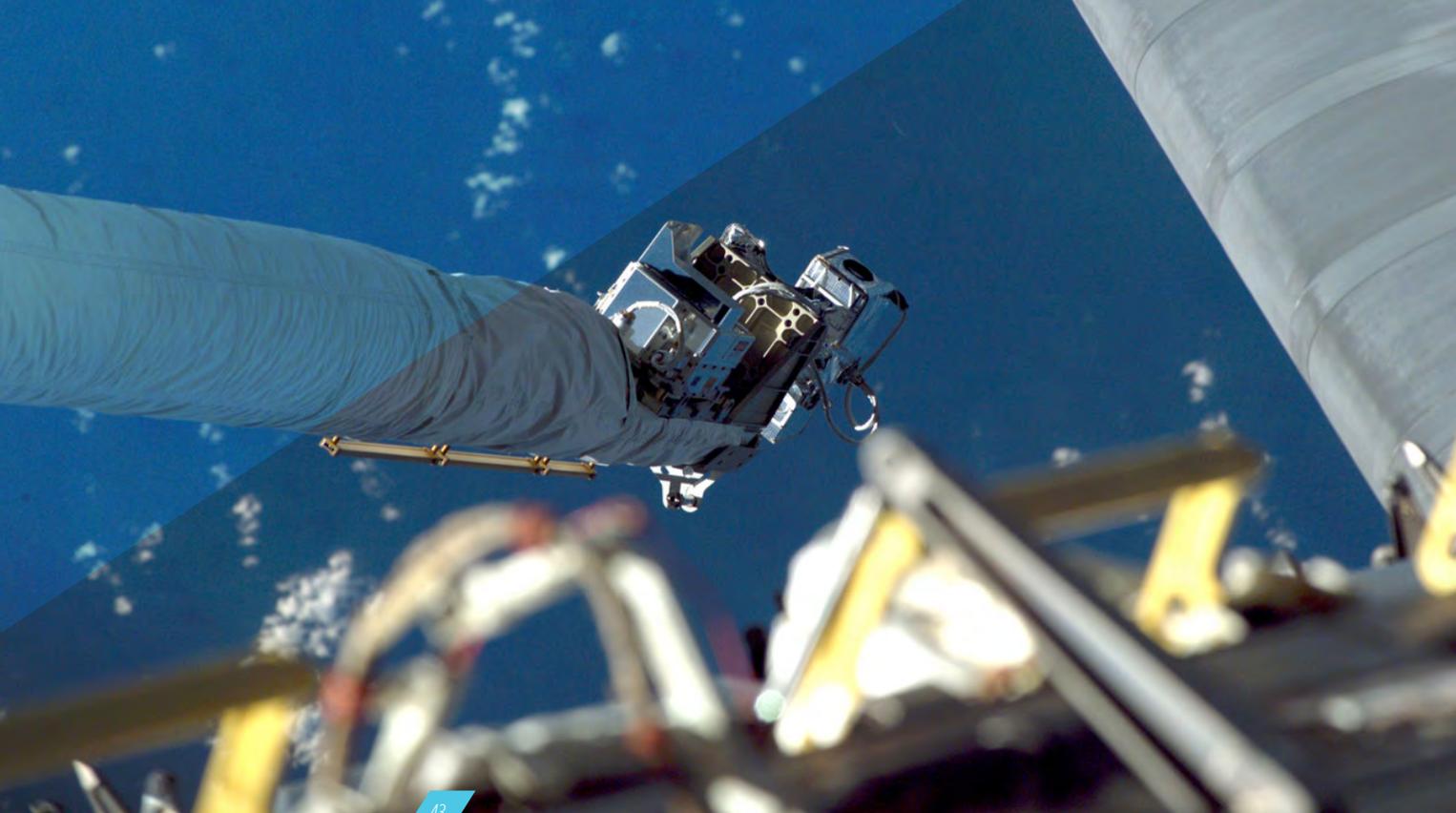
## Chemical attack detection

In 2003, PROTECT became the nation's first permanently installed detection and response system for chemical attacks in a public facility when it was deployed in the Washington, D.C.

Metro. In this multilab project that began in 1998, Sandia selected and field tested available commercial detectors and designed the advanced sensor network for the system, which also assists transit operators with emergency response to attacks.

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## Spacecraft inspections

After the Challenger and Columbia space shuttle disasters, NASA needed a way to inspect the shuttle's thermal protection shield prior to landing. A Sandia-developed sensor and robotic arm system that allows the crew to check for tiny cracks and other damage has flown on more than a dozen space shuttle missions.



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## Clean room technology

When Sandian Willis Whitfield came up with the idea for the laminar airflow clean room, it was intended to provide a dust-free environment for manufacturing close-tolerance weapons parts. Little did he or anyone else know that his idea would become a basic enabling technology for the \$1.2 trillion electronics industry, improve hospital operating room safety, and advance space exploration.

## Aviation safety

Takeoffs, landings, pressurization, and temperature changes take their toll on commercial aircraft, causing tiny cracks in the aluminum skin that must be patched and contained. An improved fuselage patch developed by Sandia and partners Delta Airlines, Textron Systems Division, and Lockheed Martin, and approved by the FAA, repairs cracks using a flexible composite material instead of the old riveted metal plates, which can cause cracks themselves.

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## Asteroid tracking

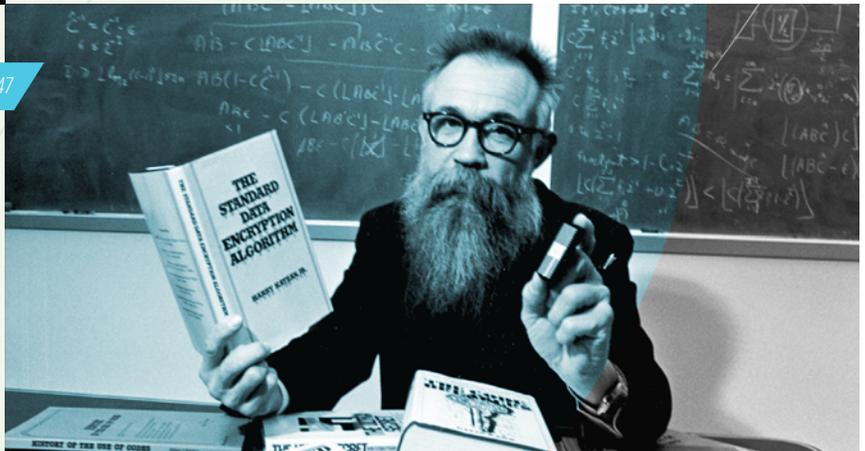
In October 2008, a global team that included Sandians Mark Boslough and Dick Spalding for the first time was able to detect and track an asteroid heading toward Earth and predict its time and place of impact. While the small asteroid posed no danger, the ability to provide early warning could be critical for larger asteroids, which strike the Earth a few times a century.



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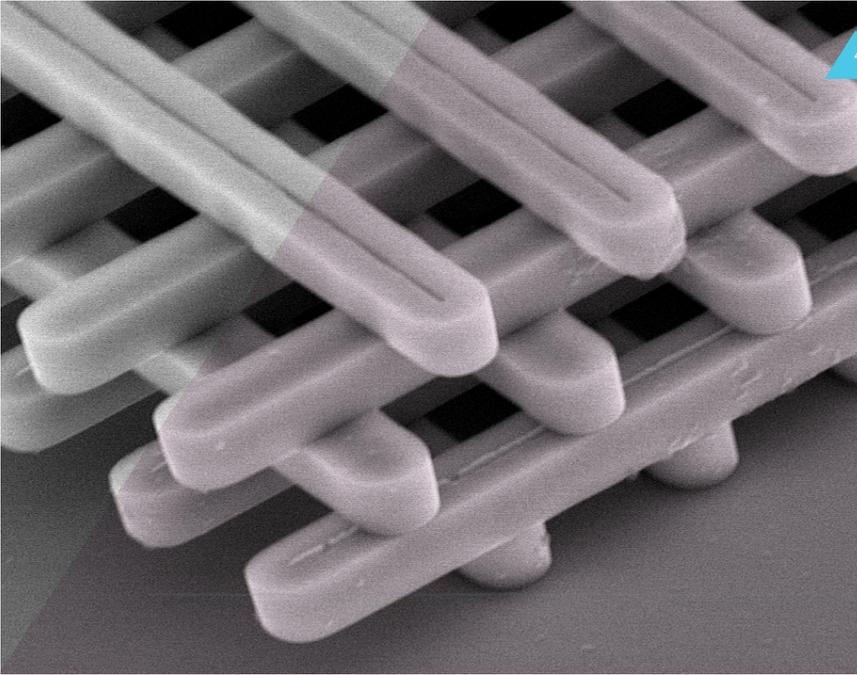
## Cryptology & authentication

During the 1960s and '70s, cryptologist Gustav Simmons pioneered the theory of authentication, used to verify adherence to nuclear weapons treaties. All e-commerce now depends upon Simmons' work in authentication.



## Modern electronics

In the 1980s, Sandia scientist Gordon Osbourn originated the field of strained layer superlattices by making the first calculations to predict their unique electrical and optical properties. This work led to revolutionary advances in electronics and optoelectronics.



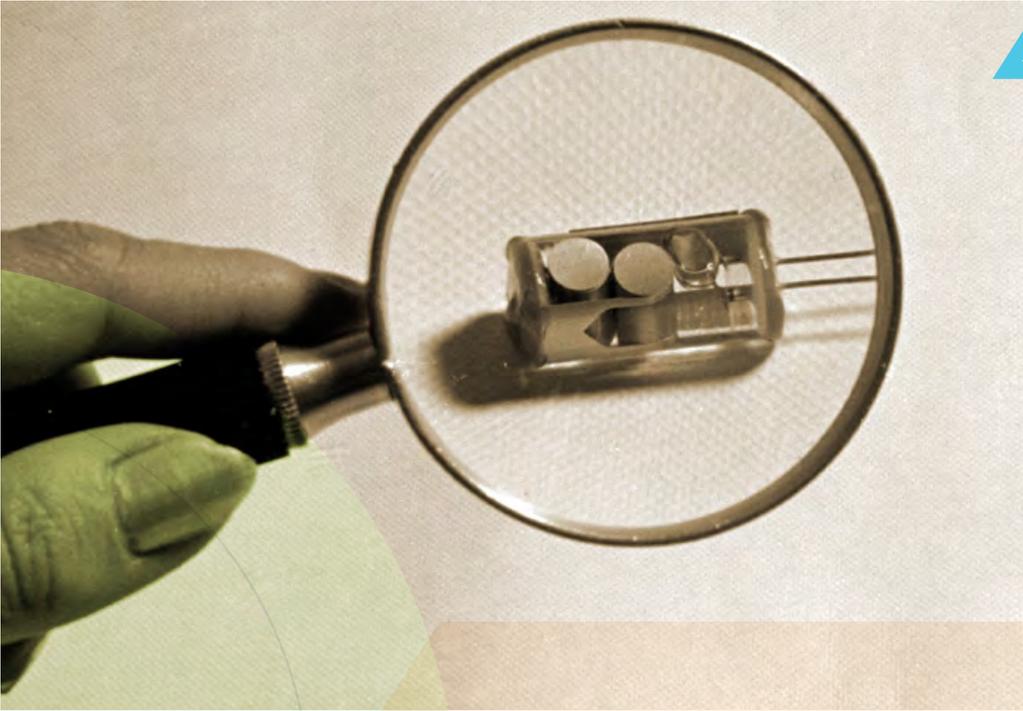
## Next-generation microelectronics

A milestone in microprocessor technology was achieved in 2001 when Sandia, Lawrence Livermore, and Lawrence Berkeley national labs, along with a consortium of chipmakers developed and demonstrated an extreme ultraviolet lithography (EUVL) system for producing the next generation of more powerful microchips. EUVL enables patterning of silicon wafers with a much shorter wavelength of light than current systems, enabling more densely packed transistors and therefore higher speeds and better performance.



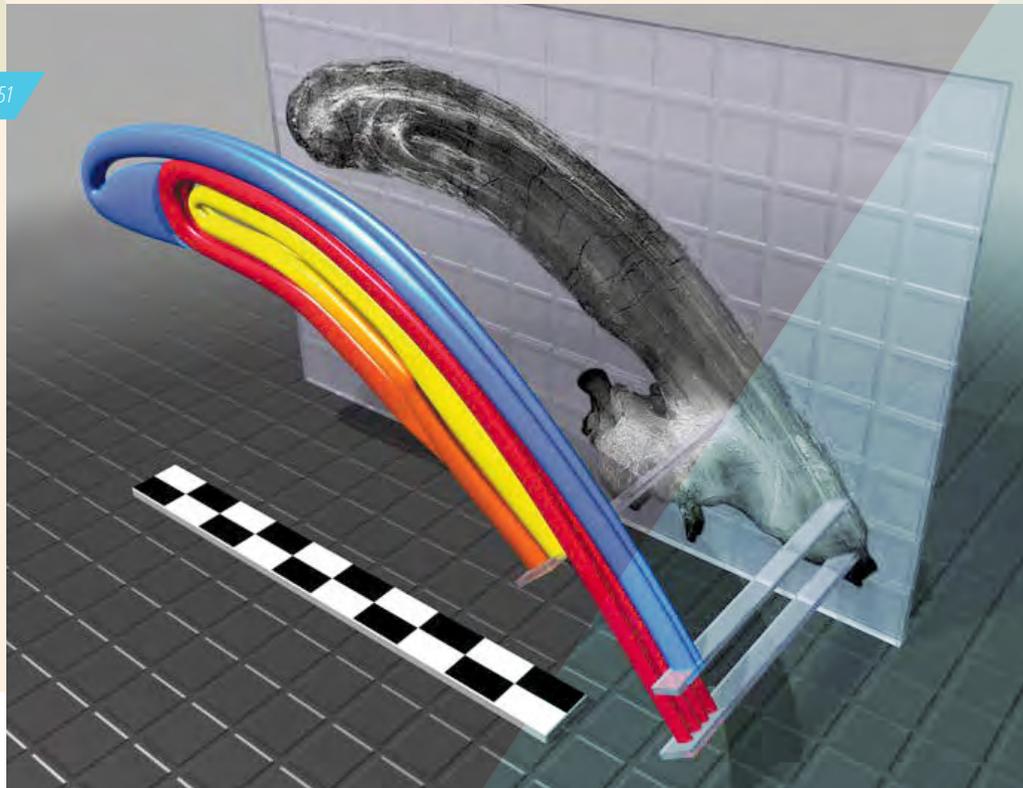
## Airbag sensors

Invented in the 1960s by Sandian Don Wilkes, rolamite switches were used to trigger the deployment of automobile airbags until they were replaced in the mid-1990s by electronic sensors. Originally developed to detect a nuclear warhead's acceleration pattern, the rolamite is a basic mechanical device consisting of a roller suspended within a tensioned band.



## Digital paleontology

In 1997, scientists at Sandia and the New Mexico Museum of Natural History and Science recreated a vocalization of a crested dinosaur that lived 75 million years ago. Using powerful computers, computed tomography (CT scans), and a rare *Parasaurolophus* skull, they produced a low-frequency rumbling sound that the dinosaur could have made.





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## Employee giving

Since Sandia's employee contribution plan introduced payroll deductions in 1957, Sandia employees and retirees have provided at least 15 percent of the United Way of Central New Mexico's annual contributions, with more than \$110 million donated to date.

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## Economic development

In 1998, Sandia broke ground for the Sandia Science & Technology Park — a 200-acre community that provides tenants with easy access to world-class technologies, facilities, scientists, and engineers. Today, the park is home to 47 companies and organizations and provides more than 2,000 jobs, with more than \$5.4 billion in wages paid over its 20-year life.



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## Small business assistance

Since 2000, Sandia and Los Alamos have provided technical assistance to more than 2,800 businesses in all 33 New Mexico counties. The help is supported by the New Mexico Small Business Assistance program, which provides the labs with gross receipts tax credits. Projects have ranged from helping Rio Nambé Pueblo create a water distribution model to analyzing metals used in locomotive repair for the Cumbres & Toltec Scenic Railroad.

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### Automated wheelchair cushion

Pressure sores among wheelchair users are a common problem, often leading to serious complications or death. Sandia and Numotech, Inc., have developed a wheelchair cushion based on microprocessor-controlled inflatable air pockets that inflate and deflate to help prevent and heal pressure ulcers.



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### Mold control

A decontamination formula developed at Sandia to render harmless a wide variety of chemical and biological agents also combats the common household problems of mold and mildew. Mold Control 500, licensed to Modect, Inc., and distributed by Scott's Liquid Gold, is based on Sandia's "decon foam" and is available in hardware stores nationwide.



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### Fukushima accident cleanup

Developed by Sandia in the early 1990s, crystalline silico-titanate was used to remove radioactive material from more than 43 million gallons of contaminated wastewater at Japan's damaged Fukushima Daiichi nuclear power plant. Sandia researchers worked around the clock following the March 2011 partial meltdown to deploy the technology in the seawater pumped in to cool the plant's towers.

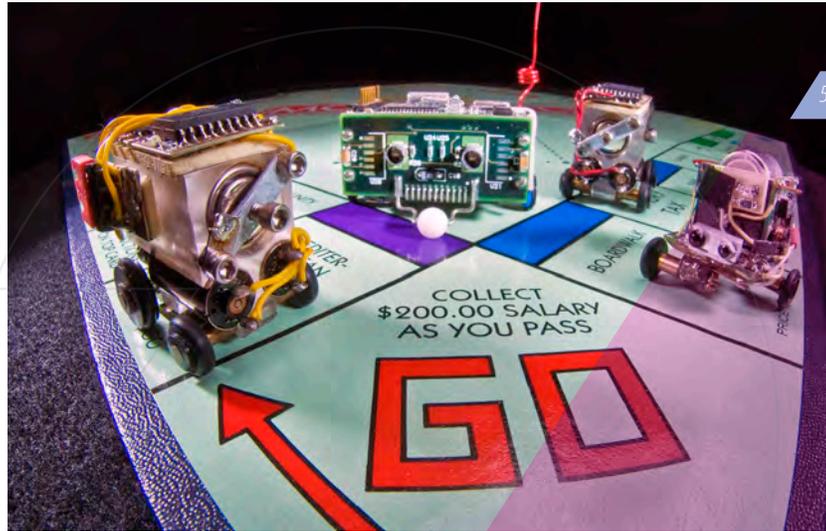




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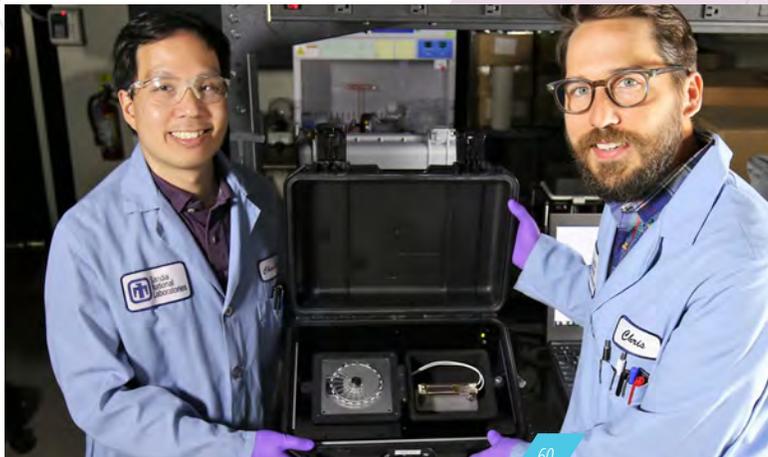
### Deepwater Horizon accident response

On April 20, 2010, Macondo Well 252 suffered a natural gas blowout that resulted in 11 deaths and 17 injuries. The explosion and fire led to the sinking of the BP drill ship Deepwater Horizon off the coast of Louisiana and the largest marine oil spill in history. Secretary of Energy Steven Chu asked Sandia, Los Alamos, and Lawrence Livermore national laboratories to directly support the federal response. For five months, Sandia staff in BP's Houston office aided the effort to stop the flow of oil into the Gulf of Mexico.



## Robotics

The Smithsonian Institution placed nine of Sandia's historically significant robots in its permanent collection at the National Museum of American History. They include miniature autonomous robotic vehicles developed in the mid-1990s that led to the creation of superminiature robots in 2001, selected by Time magazine as the invention of the year in robotics. Since then, Sandia has developed robots that can reach trapped miners, demilitarize submunitions, and disable IEDs.



## Rapid medical diagnosis

When people are in the early stages of an undiagnosed disease, immediate tests that lead to treatment are needed. Sandia's mobile SpinDX diagnostic device can test for viruses, bacteria, and active toxins in less than an hour, while the microneedles technique extracts interstitial fluid to quickly diagnose major illnesses or measure exposure to chemical or biological agents.



## Grid modernization

To improve the resiliency and reliability of the nation's electric infrastructure, Sandia's Microgrid Design Toolkit is used to design microgrids and backup power systems for military bases, private companies, and cities impacted by extreme weather events. Researchers at Sandia also developed a control system that uses real-time data to reduce inter-area oscillations on the grid, saving money and increasing stability.

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## Concentrating solar power

Commissioned in 1978, the National Solar Thermal Test Facility is home to the world's first multimegawatt solar tower and is the only large-scale high-flux testing facility in North America. Forty years of concentrating solar power research at the facility has contributed to energy, space exploration, national defense, and commercial solar power.



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## Hydrogen fuel cells

In 2016, a Sandia study found that it was technically and economically feasible to build and operate a high-speed passenger ferry powered solely by zero-emission hydrogen fuel cells. A follow-on study in 2018 concluded it was also possible to power a research vessel using the clean, quiet technology. The research led to the first fuel cell vessel to be built in the U.S. and the first commercial fuel cell ferry in the world.



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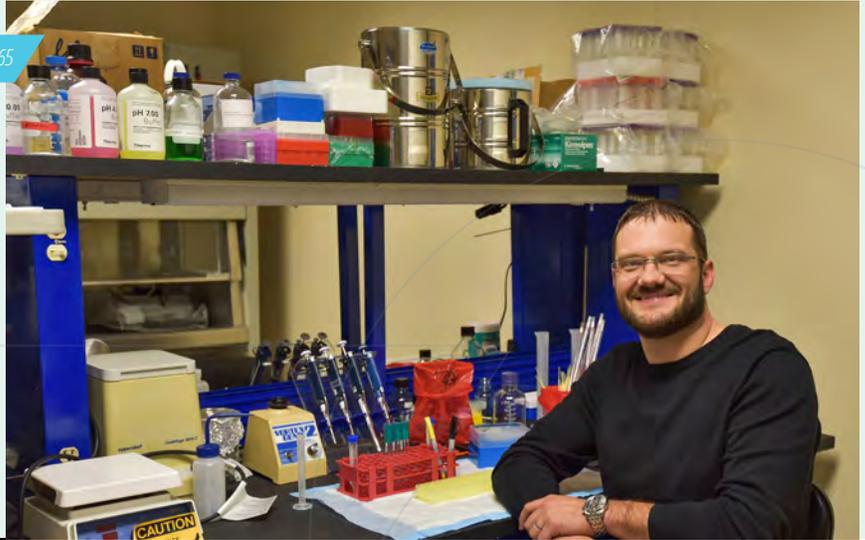
## Education outreach

Sandia has encouraged thousands of students to pursue careers in science, technology, engineering, and math (STEM) through a variety of K-12 education programs. Hands-on math and science activities for elementary school children emphasize the fun of science, while more in-depth experiences for middle school and high school students reinforce the importance of science and engineering.

## Global diagnostic labs

Sandia has helped in the design of diagnostic labs around the world that are safe, secure, sustainable, specific, and flexible. The Prototype Lab tool, developed in 2017, quickly generates construction drawings, so international partners can prepare blueprints for builders in about half the usual time. The tool has been used for such designs as the central veterinary lab in Iraq and a foot-and-mouth disease diagnostic lab in Kenya. Using modeling and simulation, Sandia also developed an optimized blood sample transportation network that dramatically improved Ebola diagnosis time during the 2014 epidemic.

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## Hypersonics

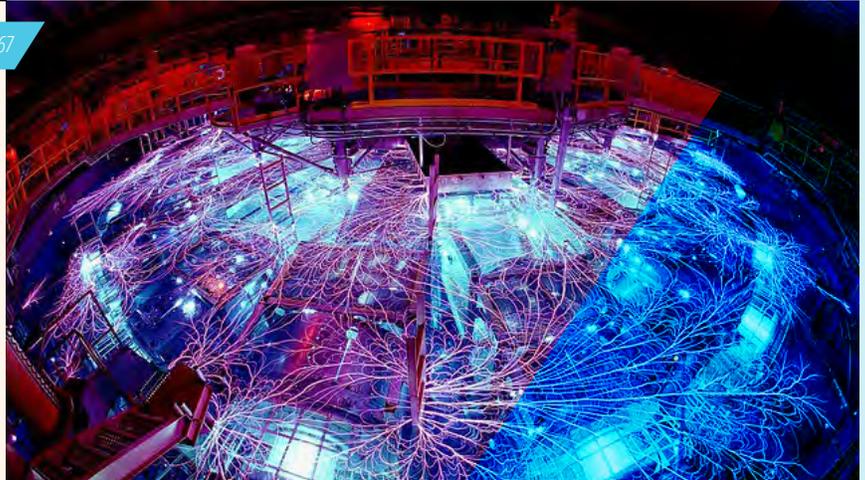
In 2011, Sandia conducted the first successful flight test of the Advanced Hypersonic Weapon (AHW) glide vehicle concept for the U.S. Army Space and Missile Defense Command. Sandia has used flight data to further develop hypersonic boost-glide technologies and conduct additional tests of aerodynamics, navigation, guidance, control, and thermal protection technologies.

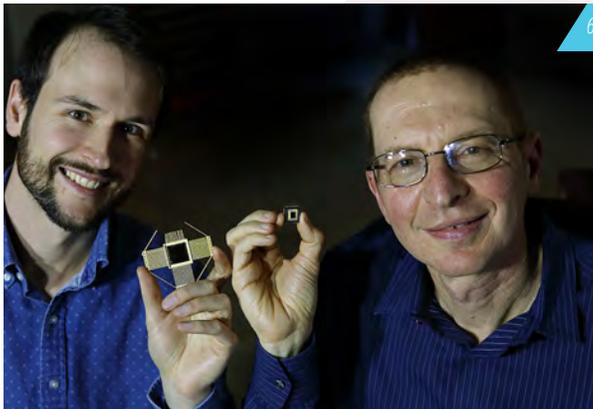


## Pulsed power

Since the 1960s, Sandia's pulsed power devices have helped assure the performance of every nuclear weapon system in the stockpile. The workhorses of pulsed power include the Z machine, the world's most powerful and efficient laboratory radiation source, capable of creating conditions found nowhere else on Earth; Hermes III, the world's most powerful gamma ray producer; and Saturn, an x-ray simulation source.

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## Neuromorphic computing

Research inspired by the human brain has led to breakthrough technology and software. The Neuromorphic Cyber Microscope's brain-inspired design can quickly and efficiently detect indicators of cyberattack. Sandia's Whetstone open-source software sharpens the output of artificial neurons, enabling neural computer networks to process information up to a hundred times more efficiently. And, Sandia has introduced a novel approach to parallel programming, which allows simultaneous processing of large amounts of information.

## Harnessing algae's dual benefits

Sandia's Salton Sea Biomass Remediation Project cleans water while producing a renewable, domestic source of fuel.

By optimizing the yield of algae grown through "attached algae cultivation," the project seeks scalable means to remove nutrient pollution — especially in agricultural runoff — from bodies of water by growing algae for bio-based products and fuel. The work holds promise for environmental remediation, jobs and economic growth, clean energy, and energy security. The approach is being tested to remediate water and harvest biomass for potential energy production in Texas, Georgia, Hawaii, and elsewhere.

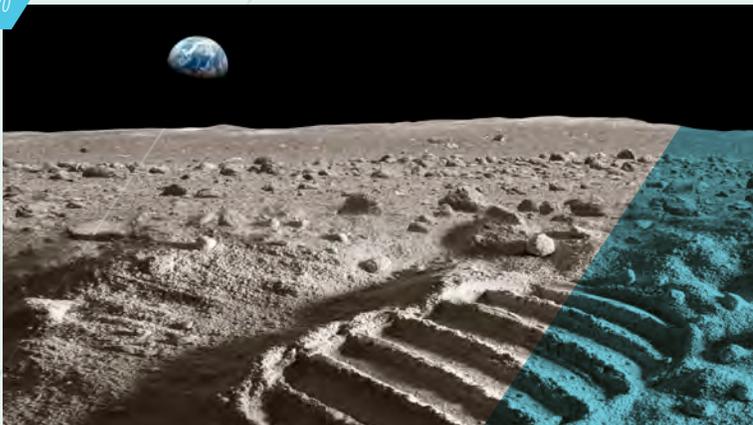
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## Going to the Moon

Sandia worked with NASA to support some elements of the Mercury, Gemini, and Apollo programs. Work on improving the clean room in the early 1960s led Sandia to develop standards for planetary quarantine — to keep Earth contaminants off other planets and other-worldly contaminants off Earth. Sandia also provided analysis and testing of radioisotopic heaters to warm seismic instruments left on the Moon by astronauts of Apollo 11, testing of astronaut seating design, technical direction for the SNAP-27 isotopic generator, and input to NASA's Aerospace Safety Advisory Panel.

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## A day in the life of Sandia — 70 years and counting

By Randy Montoya



Benjamin Hughes readies for a test beneath the Hermes III gamma radiation simulator.

The year 2019 marked 70 years since President Harry Truman used the words “...exceptional service in the national interest,” to describe his intent for Sandia. On the Labs’ anniversary, Sandia photojournalist Randy Montoya set out to capture how those words still echo throughout Sandia’s halls and buildings. He found that Sandia’s values have changed very little over the decades. Labs and offices are full of baby boomers, Gen X-ers, millennials, and centennials working together to help the nation. They remain proud and enthusiastic for their work and concerned with the wellbeing of those around them.

At any given time, people are setting up tests and repairing, protecting, maintaining, and preparing for the next day. That spirit of “we” propels Sandia’s successes: people working together closely so they can do things better today than they did yesterday. President Truman would be astonished by Sandia’s technical achievements and of the continued dedication of all Sandians, both those responsible for the work and those who enable those accomplishments.





Security Police Officer Robert Ulibarri stands on patrol at sunset near the water impact facility.



Daniel Rohe, Patrick Hunter, and Maxine Norton place diagnostics for a B61-12 model test.

Daniel Ray, lower right, sets up an experiment inside Sandia's 200-foot-tall solar tower.





Dustin Romero and Allen Gorby prepare the final stages of an extreme velocity gun test.



Weapon interns learn about the MK-5 bomb from Erik McIntire.



Katie Jungjohann readies an experiment for the transmission electron microscope at the Center for Integrated Nanotechnologies.

*Exceptional service in the national interest*



